

THE RAINFALL ON TABLE MOUNTAIN.

By THOMAS STEWART, M.Inst.C.E.

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Observations of the rainfall on Table Mountain were first taken in January, 1881, when the late Mr. John G. Gamble, Hydraulic Engineer for the Cape Colony, placed a rain-gauge at a point known as Disa Head, which is about 2,500 feet above sea-level. During the month of May of the same year another gauge was erected at a station called Waai Kopje, which is about 3,100 feet above sea-level and about half-way between Disa Head and the top of the mountain. In September and October of 1884 two additional gauges were erected—one near Kasteel Poort, 2,483 feet above sea-level, and the other at a station called St. Michael's, 3,050 feet above sea-level. These four gauges were the only ones in existence until 1888, when I placed another gauge in the Disa Valley near where the middle Wynberg storage reservoir has since been built, and about 1,500 yards from the Disa Head gauge. My reason for placing this gauge so near to the Disa Head station was that the amount of rainfall registered at the Disa Head gauge appeared to be considerably below that which fell at a short distance from it. The readings obtained at the new gauge proved that the surmise was correct, and the information was utilised by me when selecting a site for the first storage reservoir built on Table Mountain, viz., that known as the Wynberg Middle Reservoir. The taking of readings of this gauge was not carried on regularly, and was discontinued altogether for a few months, but in May, 1892, two gauges were erected at other stations in the vicinity. Both of these places were nearer to the Disa Head gauge than the one originally adopted, the nearer station being only 500 yards and the further one 1,300 yards away.

Observations were taken of these gauges continuously from May, 1892, to June, 1904. They showed that that neighbourhood received a larger rainfall than was indicated by the Disa Head gauge. Com-

paring the averages for the eleven years, 1893 to 1903 inclusive, it will be seen that the relation is as follows:—

Disa Head	37·53 inches.
Wynberg Watershed	58·18 ,,
Wynberg Reservoir (Middle)	55·60 ,,

As the results obtained from the rain-gauge which had been fixed temporarily near the middle Wynberg reservoir showed that great differences in the rainfall might be expected to exist elsewhere on the mountain, I decided in 1892, when I was investigating the question of the water-supply to Cape Town, to recommend the Town Council to provide additional gauges. On these being supplied, they were placed at various points within what has now become known as the catchment area to the Cape Town reservoirs, which extends to about 667 acres. The results obtained are, of course, applicable to a much larger portion of the mountain than that utilised by Cape Town. In 1900 another rain-gauge was erected near the existing caretaker's house.

The duty of providing for the observing of rain-gauges erected at Disa Head, Kasteel Poort, Waai Kopje, and St. Michael's was relegated to the Meteorological Commission. The actual observations were taken monthly for some years by Mr. Ellerton Fry, Secretary to the Commission, and by Mr. Gamble and myself. Afterwards other observers carried on the work. In 1896 the gauge at the Disa Head was observed daily by one of the staff employed on the reservoir works, instead of monthly as previously; but the other three gauges continued to be read by an observer appointed by the Meteorological Commission until a few years ago when the reading of these was undertaken by the Cape Town Council.

The six additional rain-gauges placed in position in 1893, together with that placed at the caretaker's house in 1900, were observed, under my direction, by one of the staff employed on the reservoir works until their completion in 1904. Since then the observing of these gauges has been done for the Cape Town Council chiefly by the caretaker, Mr. H. Thorsen, who had made many of the observations previous to 1904 and had proved himself to be a careful and painstaking observer.

Since 1904 additional rain-gauges have been placed at various points on the mountain and valuable information regarding the distribution of the rainfall has been obtained from them, but as the gauges have not been observed for 10 consecutive years I do not propose to refer to them further in this paper.

Table "A" shows the stations above the 2,400-foot level at which observations of rainfall have been taken for periods extending from 10 to 30 years. The heights above sea-level have been taken by spirit-levelling, and are, with certain exceptions, given to the nearest foot.

Of the whole of the stations from which records have been received for 10 years or more, at the end of 1911 only two had been in existence for 30 consecutive years, namely, Disa Head and Waai Kopje; but another two had been in existence for 27 years, namely, Kasteel Poort and St. Michael's. Comparing the averages for Disa Head and Waai Kopje for the 30 years with those of the same stations for the 27 years it will be seen that the differences are inconsiderable, thus :—

No. of Years.	Period.	Average Yearly Rainfall in Inches.			
		Disa Head.	Waai Kopje.	St. Michael's.	Kasteel Poort.
30	1882-1911	39·24	66·83	—	—
27	1885-1911	39·44	67·63	61·64	75·24

It may therefore be assumed for all practicable purposes that the averages at Kasteel Poort and St. Michael's would have been approximately the same for 30 years as for 27 years.

Continuing the comparison of the records for shorter periods, I would direct attention to Table "B," where the averages for all the stations in existence for periods of 30, 27, 19, 18, and 12 years previous to 1912 are tabulated, as well as the averages for the 11 years 1893 to 1903 inclusive and the 10 years 1894 to 1904 inclusive. Taking the averages for the 11 years for the three stations, Waai Kopje, St. Michael's, and Kasteel Poort, and comparing them with the averages for the same stations for 27 years :—

No. of Years.	Period.	Average Yearly Rainfall in Inches.		
		Waai Kopje.	St. Michael's.	Kasteel Poort.
27	1885-1911	67·63	75·24	61·64
11	1893-1903	68·03	75·54	61·09

It will be seen that the maximum difference between the averages for the two periods is only 0·55 inch, which is scarcely appreciable. The difference between the averages of the Waai Kopje gauge for 11 and

30 years is only 1·20 inch, which may also be considered as of no importance for practical purposes. The records for Disa Head do not show a similar state of affairs; but, as already pointed out, the rainfall recorded at this station does not afford a safe indication of what takes place on other parts of the mountain.

It may therefore be said that in so far as the determining of the average annual rainfall is concerned the statistics for the 11 years 1893 to 1903 inclusive are as suitable as the data obtained over the period of 30 years.

The agreement of the averages for the 11 years 1893 to 1903 inclusive with the averages for the same rain-gauges for the 30 years 1882 to 1911 inclusive is more than usually interesting, because the first year of the 11-year period was, with one exception (1896), the driest which has been recorded on Table Mountain since the taking of observations began, and the three following years, 1894, 1895, and 1896, were the three consecutive driest years. In striking contrast to the state of affairs which ruled during the first few years of the period is the fact that the last year but one of the period (1902) was the wettest year which has been recorded since the taking of observations on the mountain began.

So far I have dealt chiefly with the average rainfall as observed at the various stations, but this paper would be incomplete without some reference being made to the wettest station. As will be seen by Table "A," the heaviest rainfall is recorded at McLear's Beacon gauge, which is on the summit of the mountain. Regular records were obtained from this station for the first time in 1893. For 1896, which was the driest year, the total rainfall was 73·34 inches as compared with 59·58 inches at St. Michael's, which up to 1893 was the station returning the heaviest rainfall. The heaviest rainfall for any one month was recorded in August, 1899, when 36·58 inches fell, and for one year—in 1902—when the total fall was 126·18 inches.

TABLE "B."
AVERAGE RAINFALLS ON TABLE MOUNTAIN.

Month.	30 Years, 1882-1911.				27 Years, 1885-1911.				19 Years, 1893-1911.				18 Years, 1894-1911.			
	Disa.	Waal Kopje.	Kasteel Poort.	St. Michael's.	Disa.	Waal Kopje.	Kasteel Poort.	St. Michael's.	Disa.	Waal Kopje.	Kasteel Poort.	St. Michael's.	Mac-Lear's.	Waal Vlei.	Dam.	
January ...	1.20	2.26	2.02	2.54	1.40	2.87	2.39	3.01	1.46	2.83	2.47	3.08	3.21	2.71	2.40	
February ...	1.44	3.03	1.69	3.45	2.06	3.43	2.32	4.38	0.96	1.62	1.33	1.89	1.81	1.45	1.48	
March ...	2.00	3.14	2.83	3.45	3.16	3.93	4.55	5.52	3.10	3.61	3.08	3.79	3.92	3.56	3.24	
April ...	3.56	5.23	4.81	5.73	3.16	4.93	4.55	6.67	5.88	5.88	7.57	9.03	10.85	8.96	7.97	
May ...	5.25	9.06	8.21	10.00	4.26	8.54	7.41	8.88	4.82	8.36	10.25	10.63	10.85	10.50	10.00	
June ...	5.84	10.40	10.12	12.23	5.46	10.85	8.22	12.20	5.42	11.68	10.99	10.25	12.22	11.75	10.00	
July ...	5.25	8.90	8.53	10.37	4.55	8.98	8.22	10.05	4.68	9.74	8.42	10.26	13.45	9.97	8.99	
August ...	4.59	8.39	7.79	9.51	4.42	9.10	7.86	9.60	4.88	9.24	7.85	12.77	9.97	9.07	8.07	
September ...	3.50	5.46	5.12	6.20	3.37	6.08	5.29	6.51	3.98	6.15	5.13	6.36	8.83	6.91	5.88	
October ...	3.50	5.46	5.12	6.20	3.37	6.08	5.29	6.51	3.98	6.15	5.13	6.36	8.83	6.91	5.88	
November ...	1.97	3.33	3.84	3.49	1.43	3.55	2.95	4.04	3.16	3.94	3.70	4.42	4.10	3.38	3.22	
December ...	1.82	3.23	2.78	3.63	1.63	3.26	2.62	3.45	1.69	3.34	2.75	3.62	3.53	3.38	3.75	
Totals ...	39.24	66.83	61.64	75.24	36.55	69.19	61.21	74.90	36.55	70.89	61.77	75.48	89.83	73.46	64.37	

Month.	12 Years, 1900-1911.				11 Years, 1893-1903.				10 Years, 1894-1903.						
	Disa.	Waal Kopje.	Kasteel Poort.	St. Michael's.	Disa.	Waal Kopje.	Kasteel Poort.	St. Michael's.	Disa.	Waal Kopje.	Kasteel Poort.	St. Michael's.	Mac-Lear's.	Dam.	Plantation.
January ...	1.61	3.39	2.90	3.45	3.19	3.64	3.37	3.90	1.64	3.37	1.81	3.33	4.05	2.95	3.22
February ...	1.01	1.81	1.47	1.97	1.73	1.50	2.00	2.42	1.93	1.76	1.54	2.02	1.97	1.98	1.81
March ...	1.92	3.68	3.00	3.95	3.10	3.77	3.11	3.65	1.92	3.58	3.03	3.89	3.60	3.13	3.25
April ...	3.04	4.94	4.41	5.40	5.15	4.55	5.62	6.87	4.51	5.11	4.43	5.47	6.56	5.98	5.40
May ...	4.33	9.71	8.27	9.87	8.89	7.91	8.86	10.44	6.92	8.45	7.58	9.23	11.07	8.55	8.48
June ...	3.84	8.06	7.92	12.90	9.76	12.08	14.04	11.98	5.18	9.83	10.15	13.09	13.77	11.70	8.46
July ...	3.84	8.06	7.92	12.90	9.76	12.08	14.04	11.98	5.18	9.83	10.15	13.09	13.77	11.70	8.46
August ...	4.00	9.15	7.67	9.24	8.64	7.57	8.30	10.37	5.20	10.27	9.18	11.57	15.57	7.97	9.50
September ...	3.85	6.20	5.38	6.65	6.80	6.84	7.24	7.51	6.98	6.97	5.84	6.45	7.38	7.77	7.65
October ...	3.15	6.11	5.54	6.62	6.04	5.64	6.30	6.04	6.11	5.52	6.79	5.83	5.83	5.04	5.16
November ...	1.83	3.55	2.87	3.76	3.51	3.78	3.24	3.83	3.21	3.68	3.11	4.01	4.51	3.54	3.98
December ...	2.04	3.90	3.38	4.30	2.26	3.62	2.83	3.51	1.97	2.46	1.75	2.52	2.72	1.52	2.06
Totals ...	35.60	73.22	63.95	77.51	68.03	61.09	75.54	92.48	37.07	69.45	62.07	76.61	93.76	62.21	75.92